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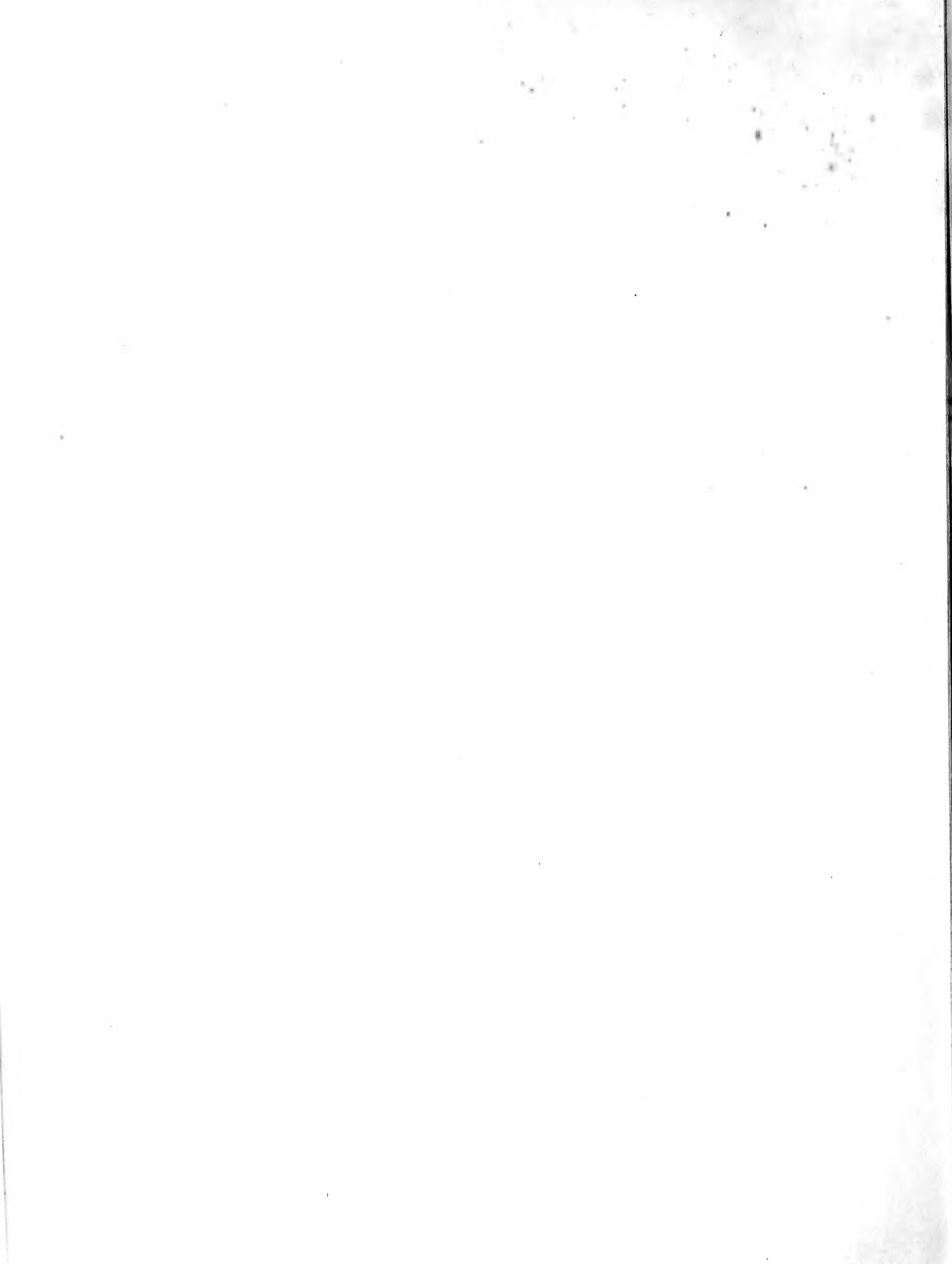
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BOOK NUMBER F763C

1931

747243



UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS

FOREST PRODUCTS

FOREST ECONOMICS

RANGE RESEARCH

January, 1931.



747243

BRANCH OF RESEARCH

January, 1931.

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ALLEGHENY FOREST EXPERIMENT STATION

General

The customary routine of office analysis of field data has been cut into by vacations and the preparation of an annual report for the Advisory Council. The Council meeting held at Atlantic City on January 10, was the best meeting we have yet had, although illness of the members reduced the attendance somewhat below what was expected. Mr. Leeds' hospitality, which extended to the wives of the Council members, added materially to its success. The Station's proposal for a greatly expanded program of work beginning with the fiscal year 1933 caused a gratifying amount of relevant discussion, and was accepted with real enthusiasm. The Council went on record as approving the purchase by the National Forest Reservation Commission of samples of such virgin areas as the tract on East Tionesta Creek, Allegheny National Forest. The investigative program under way at Pennsylvania State College and in the Maryland Forest Service was presented, and a real desire to coordinate the work of various agencies in the region was apparent. Dr. H. H. York, of the University of Pennsylvania, gave an illustrated talk on tree diseases, and without specifically advocating such action, gave several excellent reasons why a part of the one-hundred million-dollar appropriation for forest planting in New York state should be spent for research in many lines, including pathology. Dr. York still spends his summers with the Conservation Commission.

A substantial allotment from the emergency road appropriation to meet the unemployment situation, enabled us to gravel a considerable portion of the road leading from the town of Kane to the Kane Experimental Forest. The Station has found the Allegheny National Forest willing to administer the road job. A main haul road has been brushed out down the main creek draining the Forest but deep snow has prevented completing either this job or the gravelling.

During his visit to State College, Pennsylvania, Schnur accompanied Mr. McIntyre to the Pennsylvania Farm Show at Harrisburg, where he learned that the maple syrup in Pennsylvania reaches no mean proportion; 2,000,000 gallons are produced in the State, and together with some sugar are worth probably \$3,000,000 a year. Many of the sugar producers appear to be interested in forestry as applied to their sugar bushes, and McIntyre has been making a study of yields from trees variously spaced. The demand for maple products appears to be increasing, and one farmer at the show stated that he had netted \$1000 last year from his sugar bush.

Forestation

Wood prepared a progress report on the Camp Ockanickon plantation. He shipped the seed collected locally at Camp Ockanickon in the fall to the State Nursery at Washington's Crossing, New Jersey, which will raise

(Over)

the stock necessary for future plantation at the Camp. We hope some day to receive seedlings raised from the small quantity of pitch pine seed Wood collected last fall from trees whose location is marked. State Forester Besley of Maryland has offered loblolly pine seedlings for use at Ockanickon. Wood has been analyzing some of his plantation measurements in the light of Wakeley's recently circulated article, and finds that not less than 85 of his red pines, for example, are necessary to give less than 1 per cent average deviation.

Measurement

Schnur in collaboration with Mr. McIntyre, started work on a volume table for bituminous props. After consideration they decided that the great variation in size of bituminous props prevented their preparing any more ambitious form of table than one showing the merchantable length in mine props and top diameter to be obtained from trees of different diameters and heights. Schnur's visit to State College brought about a coordination of the work of the two institutions in the only field where we have apparently overlapped.

Special Study - Mycorrhiza

Hatch returned to Philadelphia early in January, and on January 26 a meeting was held to discuss the program of work in the mycorrhiza study. This was attended by Drs. True and York of the University of Pennsylvania, Drs. Hartley, and Colley, Director Forbes, and the two men immediately concerned. The decision was reached to place the first emphasis during the coming year on a survey of mycorrhiza occurrence in the Allegheny territory. Laboratory work will be largely confined to the culturing of the fungous mantles for eventual identification, and to the development of technique in the pure culturing of host and fungus.

Types

Hough has continued his analysis of the data from the virgin tract on East Tionesta Creek, having placed most of the data on cards. He has segregated the data by three topographical divisions: plateau, middle slope, and lower slope.

After attending a meeting in Washington of the type committee for the eastern United States, Forbes is satisfied that some of the generalized types which will do very well in a localized territory will not be very useful when the entire East is considered as a unit. This inevitably means the setting up of a good many more types than at first seemed desirable. Morey continued his work in the analysis of seedlings and stump tapers at Heart's Content, a necessary step in the consideration of height and age relationships at that point. In counting rings both on seedlings and on the stump sections which he had brought in from Heart's Content, Morey

has been accumulating some very valuable information on the preparation of sections for examination with the hand lens or low-powered microscope.

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APPALACHIAN FOREST EXPERIMENT STATION

General

The Bent Creek Laboratory and the experimental forest were the scene of a game management meeting called by Supervisor Mattoon of the Pisgah National Forest, on January 13, 14, and 15. Frothingham, Barrett, Sims, and Burleigh attended one or more of the meetings. Burleigh spoke on "The study of feeding habits of game animals and methods of observation and record". Among those in attendance from out of town were: R. R. Hill of Range Management, Washington; A. M. Day, Division of Predatory Animals and Rodent Control, Biological Survey; I. T. Yarnall, Region Seven Office, and C. G. Smith, Supervisor Cherokee Forest.

The annual meeting of the Appalachian Section of the Society of American Foresters was held in Asheville January 24. The morning session was devoted to a discussion of a public forest policy for the Southern Appalachian Mountain Region. It was lead by J. S. Holmes, state forester of North Carolina. In the afternoon Hursh spoke on "Forest Soils and Fire Damage", and Sims on "Forest Trees and Fire Damage". Between the sessions three meetings of the Appalachian Forest Type Committee were held and an agreement was reached on a proposal for grouping the forest types of the Central Forest.

Forest Management Study in North Georgia

Considerable progress was made by Hursh and Barrett on computations connected with the north Georgia growth project. Final tables and graphs showing the forest composition of various condition-classes were prepared. These will be used in a technical report outlining results of work done in the region last fall. The basic data were obtained from commercial timber estimates of 33,000 acres in the region along with over 60 sample strips.

From increment borings periodic annual growth percentages for the last two decades were computed separately for all sample strips. Tables were prepared showing the increment by decades of both merchantable cubic feet and board feet on average-stocked cut-over slopes, as compared with old field stands of mixed hardwoods at similar elevations.

Tentative outlines for two different reports on the Georgia work were drawn up by Hursh. The plan is to write a detailed technical report covering all phases of the Georgia project from which information can be taken for a short bulletin of popular nature to be published in cooperation with the Georgia Forest Service.

Work on the Bent Creek Experimental Forest

Cutting on one unit of the experimental forest was completed. Under Buell's general direction a total of 284 cords was removed by the Asheville Woodyard Committee of the Employment Council, or 25 cords per acre for the 11.4 acre unit. The trees were very closely utilized, all the tops being taken down to 1 or $1\frac{1}{2}$ inches. Eight cords per acre were left standing in this improvement cutting. Since much of this is in small trees the cutting is not as severe as the proportionately large volume of wood removed might suggest. Work has begun on an adjoining unit, which has been marked to simulate a national forest commercial cutting. No trees less than 14 inches will be removed on this unit of 9.7 acres.

Fire Damage Studies

The analysis of the data taken last August on the plots at McFalls Creek, Natural Bridge National Forest was completed by Sims. These plots, originally established to study methods of treatment of cut-over areas, were accidentally burned over in April 1930. The excellent records on the plots before the fire render them valuable for the study of the effects of fires, especially on reproduction.

The data presented in the following table (Table 1) were taken on ten quadrats in each plot. The quadrats were 0.1 chain x 0.5 chains, or 0.005 acres each. On these quadrats the individual stems and the tallest sprout in each clump, when over 1.5 feet high, were tagged before the fire. A tally of individuals and sprout clumps shorter than 1.6 feet was also made. Thus a record was obtained of the total reproduction present. No tagging was done after the fire but each individual seedling or single sprout and each sprout clump on the quadrat was measured and recorded during July 1931.

Table 1. Changes in composition and amount of reproduction (trees less than 2.5 inches d.b.h.) caused by fire, McFalls Creek, Va., in April 1930:

	Before the fire		After the fire		Per cent of
	August 1929		August 1930		original num-
	No. of trees	Per cent	No. of trees	Per cent	ber after
	per acre ^{1/}	of total	per acre ^{2/}	of total	fire ^{3/}
Plot 1.					
Desirable species	16,240	42.1	14,600	65.5	89.9
Less desirable species	22,360	57.9	7,680	34.5	34.3
Total	38,600	100.0	22,280	100.0	57.7
Plot 2.					
Desirable species	21,640	44.2	8,980	56.1	41.5
Less Desirable species	27,360	55.8	7,020	43.9	25.6
Total	49,000	100.0	16,000	100.0	32.6
Plot 3.					
Desirable species	41,880	72.3	12,580	55.2	29.6
Less desirable species	16,080	27.7	10,040	44.8	62.4
Total	57,960	100.0	22,620	100.0	38.7
Average, all plots					
Desirable species	26,587	54.8	11,987	59.2	45.1
Less desirable species	21,933	45.2	8,217	40.3	37.6
Total	48,520	100.0	20,204	100.0	41.7

^{1/}Sprout clumps not included

^{2/}Sprout clumps included. Clumps were counted as one tree.

^{3/}Entirely new growth; the original reproduction was completely killed by fire.

The most important of the species included in "Desirable species" in the above table are white pine, yellow poplar, white oak, chestnut oak, and black oak, hickory and black locust. In the "Less desirable species" are included dogwood, sourwood, red maple, black gum, sassafras, scarlet oak, and a few other species. The classification included the same species after the fire as before.

Table 1 shows that in this instance the fire was not an unmitigated evil. Thus, when the data from all three plots (0.15 acres of quadrats examined) are grouped together the percentage of desirable reproduction was increased. The stocking, 12,000 stems per acre, of these species is ample. This holds true for plots 1 and 2. Plot 3, although suffering a lowered per cent of desirable species, is still well stocked.

Even though the percentage of desirable species and the stocking are now adequate, serious changes in the composition of the desirable group occurred. Chief of these were the almost complete loss of white pine, which constituted from 9 to 18 per cent of the original reproduction, and the great increase in black locust seedlings and root suckers. Black locust increased from less than one per cent before the fire to over 20 per cent following it.

Of the species included in the "less desirable" group, red maple was hardest hit. On plots 1 and 2 this species was reduced from about 25 per cent of the stand to 5 per cent, while on plot 3, although 60 per cent of the red maples were eliminated, the percentage in the stand was maintained at 14. Because of the heavy reduction of red maple, small gains in the numbers of dogwood, sourwood, and black gum on plot 3 are obscured in the averages for all plots.

While showing an improvement in the composition of the stand on the basis of grouping the species as "desirable" and "less desirable", Table 1 takes no account of changes in origin of the trees. The reproduction present before the fire was killed completely above ground so that now the reproduction is composed almost entirely of sprouts, although yellow poplar and black locust seedlings started after the fire in considerable numbers. Whether or not they will succeed in competition with the sprouts remains to be seen.

From a study of the sprouting characteristics of the burned tree reproduction less than 4.5 feet high on the quadrats, the following generalizations can be made: The average number of sprouts arising from a seedling was two; the average number from a sprout was from two to five; no constant difference was found between the average or the maximum height of the sprout clumps arising from seedlings and those arising from sprouts; less desirable seedlings, when burned, yielded taller sprouts than seedlings of "desirable" species, but "less desirable" sprouts did not yield taller ones than "desirable" sprouts.

Data for burned reproduction greater than 4.5 feet high are sparse but they indicate that, as is the case with the smaller reproduction, sprouts give rise to more sprouts than do seedlings, and that this larger reproduction yields more and taller sprouts than does the smaller reproduction.

Biological Survey Activities

Burleigh and an assistant spent the last two weeks of January on the coast of North Carolina and Georgia, making a preliminary survey of wild life conditions as far south as Darien, Georgia. In company with Mr. Redington, Burleigh visited Blackbeard Island, off the coast of McIntosh County, Ga. In a report Mr. Burleigh said "Rich in historical lore Blackbeard Island has, despite a frequent change in ownership during the past century, remained unexploited and largely untouched and today offers a glimpse of virgin wilderness unequaled anywhere in the South. Unlike many islands of this size, natural conditions for the protection and increase of wild life are remarkably varied and afford suitable haunts for many species of somewhat exacting requirements".

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CALIFORNIA FOREST EXPERIMENT STATION

General

A big job that dropped out of a clear sky this month was the preparation of a picture-and-legend story of the Station activities. This was for a different angle of public education than the one prepared last month for Kotok at Washington, this being united with similar material for the R. O. to tell the story of the Region. The brunt of both these fell on Kraebel, who did a fine piece of work.

At San Francisco on January 6 and 7 was held a joint meeting of the Land Reclamation Section and Western Division, Society of Agricultural Engineers, in which the Station participated through Dr. Lowdermilk. This gave us a much desired opportunity to present the forestry point of view on water and erosion control to that audience.

Forest Management

Compilation of methods of cutting data was continued throughout January. Hasel completed the progress report for the Sierra plot. Several other plot summaries have been checked preparatory to writing progress reports. Summaries for the three plots in the Stanislaus woods and mill study have been pushed ahead in preparation for a meeting of the special white fir committee.

Since Clements' arrival he has begun preparation of his progress reports. Reinecke completed the analysis of the effects of variations in composition on yield in second growth stands. He is now engaged in the analysis of some 1900 reproduction quadrats to determine the number of such samples necessary to adequately represent the conditions being studied.

Redwood Investigations

The entire month was spent in working up a bibliography for the redwood region and in reviewing some of the literature. We now have over 850 different titles which includes the bulk of the material which has particular application to redwood and its associated tree species.

Utilization is by far the best developed branch of redwood investigation, with a total of about 400 titles. Many of these, however, refer only to letters, notes, and unpublished reports. There are in the general literature, as would be expected, many articles on the redwoods of a popular nature which are of little scientific value.

The resources and production of the redwood region are probably better known than for many other western areas, though the data on resources are in unpublished reports.

There is a limited amount of material on growth and yield but very little on silviculture. One of the most serious drawbacks to forestry and other investigations in the northern redwood belt is the total lack of any reliable base map, this region not having been covered by the U. S. Geological Survey topographic maps. Largely because of this we have little information on either the geology or the soils of the three northern counties, Mendocino, Humboldt, and Del Norte, which comprise the main part of the redwood belt.

Cover Type Mapping

Five 2-man crews have been in the field on the Cleveland National Forest and reports show that some 30 townships have already been completed and over 200 sample plots taken. There were only 3 days when field work could not be done because of rain. The identification of a large number of species encountered for the first time in the cover type work presented a problem because classification keys are in the main useless at this time of the year when flowers and fruits are not available

While in southern California Wieslander started Junior Forester Murphy on the preparation of a series of overlays on the Angeles National Forest cover type map, based on the sample plot data, zoning the chaparral cover into the following height, density, and depth of litter classes:

<u>Height zones</u>	<u>Density zones^o</u>	<u>Depth of litter zone</u>
0 - 4 feet	Easy	Under 1 inch
5 - 8 "	Moderate	1 - 2 inches
9 ft. and over	Difficult	Over 2 inches
	Impenetrable	

^oBased on ease or difficulty in getting through the brush.

These overlays in effect indicate the amount of fuel available and should be of considerable administrative value in rating fire hazard.

Clar spent the month in the office transferring type data from field maps to the State map (U. S. G. S. Lambert Base). This serves as a progress map and when completed will present the type data as it will be published on a small scale state-wide map.

Forest Influences and Erosion

Only three storm periods have occurred during December and January. The total rainfall is still below the average. The records from the four surficial run-off and erosion installations have been correspondingly less than were hoped for.

A number of considerations are arising from the data from the surficial run-off and erosion installations. The strip charts which are driven in the instruments at the rate of 6 inches per hour make possible the correlation of rain intensity to rate of run-off, to minute time intervals. Accordingly the data from these charts are plotted in the following ways:

1. Rain intensities by minute intervals.
2. Cumulative rainfall curves.
3. Rate of run-off by second feet per acre by minute intervals.
4. Cumulative run-off in cubic feet per acre.

In those installations where surficial run-off from plots under natural cover is compared with that from plots burned bare, the differences have thus far been found to be very large. In fact, there is generally no basis for comparison, since it is unusual to record any run-off from the covered plots except from a certain type of chaparral cover. Erosion proves to differ in like manner. The amount of surficial run-off from a pair of burned plots shows interesting variations. The duplicated plots are designed to discover the variations which arise in sampling. The variations are beyond probable errors.

The disclosure of unknown variables in duplicates confronts us with a number of possible procedures. One would be the smoothing of surfaces, as is done in cultivated plots, but the very nature of the experimentation precludes this measure. Another, is to modify the installation, by breaking up plots into smaller areas, and other requirements which remove the results more and more from representative conditions. This possibility deserves consideration, however, for the objective of experimentation is the discovery of controls. It may even be necessary to submit certain factors to tank experimentation as was done in the case of forest litter. Still another possibility is the acceptance of the results as containing unknown variables which operate throughout the data, but are subordinate to the major contrasting conditions of cover against a bare soil caused by burning. Experimentally results of this sort are always unsatisfactory, and leave further experimentation to be done.

In studying the plots it is apparent that the irregularities of surface topography of the soil will influence in an important way the development and junction of surface drainage channels of surficial run-off. The manner in which drainage takes place will affect the rate of surficial run-off and the quantity as well.

Even more elusive are the variations in intensity of rain and their time intervals. Since superficial run-off flows over pervious soil, which is extracting a certain quantity continuously, run-off will occur only when intensity of rain exceeds the rate of soil absorption. If, however, the duration of this run-off-effective rain intensity lasts only long enough for surficial run-off to flow, let us say, 25 feet, then the run-off comes not from the entire plot but from less than 1/4 of the plot.

The effect of intensities and durations can be expected to be uniform for the two plots, but where surface irregularities affect the concentration of surface flow in drainage channels, there arise possibilities of further variations. There is indicated, therefore, room for further experimentation under controlled conditions and artificial rain to determine the behavior of accumulation of rivulets in rate of flow and in transporting power for sediment.

Grand Jury Indicts Brush Forests

An unusual procedure was taken by the 1930 Ventura County Grand Jury in December. Among its recommendations appears the following:

"10. That the present policy in the county in respect to harboring of brush growth be discontinued because of fire hazard."

In support of this recommendation the Grand Jury expressed itself as follows:

"During the last few years the growth of scrub brush and other inflammable materials on the National Forest Reserve within the county has increased to an alarming extent. . . . It has apparently been the theory that the cultivation of this growth conserves the water supply and prevents erosion. This, however, we believe to be contrary to the fact for at no time in our history has the water level within the county been so low as at the present time.

"This tremendous growth of brush requires moisture to sustain it; moisture which would otherwise find its way into the streams and underground water courses and be available for use. We believe that a policy of conservation which would require the burning of certain areas yearly with the idea of creating fire breaks is a policy which should be adopted. . . ."

The Grand Jury recommendation does not reflect the prevailing opinion in Ventura County as interpreted by the County Conservation Committee, but it demonstrates two things: One, that the people are actively concerned with the question of the role of chaparral forests in the yield of water from their mountain watersheds; and, two, that the influence of such vegetation has not been definitely established, and calls for determination that will answer the question in the minds of those interested in the water problems of the State. A paper entitled "An analysis of the role of chaparral forests in the yield of water from watersheds of southern California" by Lowdermilk, which was prepared in September, sets forth the nature of the problems involved and points for experimental attack for determination of the question involved.

Director Forsling's visit

The visit of Director C. L. Forsling was, among other things, to discuss installations and technique in studies of influences. A field trip was made to see the Northfork installation.

Forestation

Devil Canyon

Planting experiments, transplanting and distribution of stock have been the principal activities under Weaver's direction. With an old Fordson tractor and a much-repaired hillside plow an old field was broken for the planting of demonstration areas of Coulter, knobcone, and digger pines. Group plantings of Coulter and knobcone pines were also made at an elevation of 3400 feet in a chaparral area burned November 22, 1930. Shipments of stock were made chiefly to Santa Barbara and San Diego counties.

Enthusiasm for planting continues unabated in certain quarters of southern California and the demand for trees, both in numbers and suitable species, greatly exceeds the supply available at Devil Canyon Nursery. The Station acted as a liaison agency in securing trees for worthy projects from the State Forester, Los Angeles County, and the unique botanic garden of the Rancho Santa Ana. This interesting garden, dedicated to the accumulation of exclusively California species, is supported by the woman who owns the ranch, and is in charge of an erstwhile professor of botany.

Feather River

The arrival of heavy frost and snow, before the receipt of our supply of sugar pine seed, prevented the fall sowing of this species.

Fire Research

Visibility Studies

Visibility maps cover the area of the Sacramento Canyon of the Shasta National Forest in the experimental fire forest area. A close comparison by means of overlays was made to determine the most effective combination of lookouts. The results of these various combinations give a visual record of the coverage of the locations selected. This allows the weighing of the relative values of different combinations and the choosing of the most effective and practical lookout points. From the maps the relative efficiency numerically expressed can also be worked out to aid in the final selection of the lookout system for this area. The numerous tracings required are thought well worth the effort as when the final tentative selection was made the blind areas were readily evident. Points were chosen by inspection of the topographic maps which might be expected to cover these blind spots. Profiles then determined whether or not such selected spots provided the coverage desired. Further work is to be done.

Radius of vision

From lookout observations a study was started to determine the factors entering into the radius of visibility from the Frazier Mt. Lookout on the Santa Barbara. The collection of data was instituted by Ranger De Lapp of that Forest in 1927-1928. Curves of distance over direction, time of day, humidity, etc., were prepared and the values obtained were studied. No definite conclusions can yet be drawn but it is evident that for this particular lookout, based on a two year average, we are able to predict for time of day and direction the efficiency of the lookout point as affected by average atmospheric conditions. This efficiency can be shown graphically on the visibility map and can be used as a seasonal check of lookout performance.

Effectiveness of Lookouts

In connection with a study of the effectiveness of our present detection system all available data were tabulated for one sample forest and this will be done for one other forest. Individual fire reports, lookout fire reports, dispatcher records, and lookout check reports prepared by the dispatcher for the last three years were examined and tabulated. The purpose is to have in summarized form -

- (1) the number of chances a lookout had to see individual fires as determined from the visibility map;
- (2) where visible, to determine how many reports from lookouts were voluntary first and seconds in different discovery time periods;

- (3) to determine how many reports were invitational firsts or seconds, for the same discovery time periods.

Man-caused and lightning fires were kept separate, due to the "hold over" qualities of lightning fires.

Graphic analysis will later be made of the data. However, it appears that our detection is much below the standard desired. It is evident that small A fires, even though in direct visibility within a fifteen mile radius, may or may not throw up enough smoke to be seen by the lookout. A great deal depends on atmospheric conditions and the type of fuel in which the fire is burning, topography, wind direction, height and density of the timber stand and other factors beside the efficiency of the lookout man.

Bibliography on Subject of Visitility

Some time was spent in the preparation of a bibliography on various phases of visibility. Considerable literature is available on this subject and references are now gathered together so as to be readily accessible.

Products

Abietene and heptane

In chasing through literature references on heptane from Jeffrey and Digger pines, for the preparation of a bulletin, Hill has found considerable education, and some of the facts may be of interest to others. All who have paid attention to this matter know that these California pines were the first in which a paraffin hydrocarbon was found to be produced as a physiological product of plant life. This was so unprecedented, in fact, that it caused a 25-year scrap in the chemical world.

That the volatile oil of these trees was quite different from turpentine was discovered during the Civil War, in the tapping for turpentine to replace the Southern products then cut off from the North, and not as Stowell Smith thought in his article in the 1914 Proceedings of the Society, in the last gasps of that industry when it was being killed by the post-war come-back of South Carolina. But for a number of years nobody knew what was the chemical nature of the new substance. The first account of this product in the technical (chemical) literature was published in 1872 by Professor W. T. Wenzell of the California College of Pharmacy in San Francisco (later absorbed by the University of California); but its chemical identity as normal heptane was not discovered till 1879, by T. E. Thorpe, in Leeds, England. The last echoes of the doubters as to its validity

had only just been silenced when the Forest Service experiments on turpentine production from western pines was begun in 1910. This included in California some work on the heptane producing species.

It is not so widely known, outside of professional chemists, that in later years heptane has been found in Russian pine tar (species source unfortunately not reported), and in the nuts of a Philippine hardwood tree, the "petroleum nut" (Pittosporum resiniferum); also, that another paraffin hydrocarbon, undecane, occurs in the Indian 5-needle pine, P. excelsa. The latter fact suggests the possible desirability of re-examining the oleoresin of the 5-needle California sugar pine. Schorger, then with our Forest Products Laboratory, in 1919 reported finding in the volatile oil of sugar pine oleoresin 2-3 per cent of an unidentified paraffin hydrocarbon; but this was so unbelievable that he concluded it must have been due to an unintentional contamination of his own glassware with some petroleum fraction. The exactness with which this duplicates the mental reaction of many earlier chemists to the reported presence of heptane in the oleoresin of Jeffrey and Diggar pines, is not a little interesting and may be significant.

It is now known, also, that paraffin hydrocarbons occur in the oils and the surface protective "waxes" of many flowers and leaves. They are especially abundant, for example, in oil of roses. These paraffins, however, are almost entirely the higher homologues of the series. Thus the occurrence from vegetative sources of a paraffin hydrocarbon as low as heptane is still uncommon - enough so to save California's claims to be "unusual". (E. Bateman, please note.)

Logging - Milling Study

Thanks to the new University tabulating machine equipment located next door to the Experiment Station quarters, which we have been able to use for the first time, and have used practically every working day since the middle of December, a preliminary report of the Pickering project will be ready about the middle of February. It is not possible at the present writing to give a condensed summary of the relative values of different grades of sugar pine, western yellow pine, fir and cedar logs, though such data will all fall into line in two or three more days, but it may be of equal interest to note a short-cut method of converting green chain lumber grades into final values delivered at the car door.

There are, for example, fourteen log tables to be worked out - four grades of sugar pine, four of western yellow pine, three of white fir, and three of incense cedar. Diameters run from 8 inches to 76 inches. There are fourteen grades of lumber in each pine species, to say nothing of several different thicknesses and widths in each grade, all varying in value. White fir has ten different grades and cedar has nine. Trees are to be separately evaluated by D.B.H. and tree class,

which means 28 more segregations, aside from the log tables. To figure all of these through step by step, - first, the correction of marked green grades to true green grades; second, from the corrected grades to the rough dry grades; third, from the rough dry to surfaced; and fourth, from surfaced to the final trimmed and ripped values ready for shipment - would require more time than the maximum period allotted. A short-cut would not be possible were it not for the degrade study which was made following the sawmill tally. With the aid of these results, final values for each lumber grade were computed, directly from the depreciation and planer studies and then applied to the green chain grades as shown on the machine summaries. After drying, part in the yard and part in the kiln, the original grade mark was tallied, then the corrected grade when correction was necessary, then the rough dry grade was entered in the same line, and finally, for the pieces to be trimmed and ripped, the ultimate grades and dimensions were recorded. These were all punched on the cards. Sorting on the original green grades, it was then an easy matter to tabulate the corresponding rough dry grades for each thickness and width. Planer studies correlated the rough dry with the surfaced dry grades. The steps in establishing the final values for each thousand feet of green chain grades as recorded in the study begin with the planed lumber, thus:

1 M ft. of rough dry B & Better 6/4 sugar pine, value
\$83.00, changes, after surfacing, to:

59.4% B & Better
8.6% C Select
12.5% #3 Clear
11.7% D Select
7.8% #1 Shop

which gives an average S2S Shipping value of \$73.02.

If 25% of all B & Btr. is surfaced, the final selling value as shipped, part S2S and part rough is then \$80.52.

In the same manner, end values were established for all species-grade-dimension segregations with rough dry grades as the starting point. These values were then weighted according to the initial-green-grade-rough-dry-grade correlation, giving a series of selling prices ready for application directly to all log grade and tree class summaries. Later, all steps will be worked out individually, at least for diameter groups, so that each phase may be analyzed separately.

The planer study gave results so different from the estimates of planer degrade given by lumbermen, who have evidently not made any accurately controlled test runs, that the published report may prove to be rather startling. In some grades there is an actual gain in value and in others the planer loss is four or five times greater than commonly estimated.

White fir

The maximum value for white fir logs (1929 selling prices) was \$24 per M feet, dry value, green, as tallied on the chain. This is for grade I logs 44 inches in diameter. One log went to \$25.12 but was only a lone point out of line with the rest of the curve. As the production costs for this size average around \$20, not including stumpage, it can readily be seen that the margin of profit will be pretty low for the species as a whole.

The Lumberman's Committee, mentioned in previous reports, which was organized to thresh out the problems of timber sale requirements in general and white fir requirements in particular, held another session early in January but did not resume any discussion of the "troublesome" species. They are awaiting the mill study results before they concentrate their artillery for the final drive.

Consulting Entomologist

Dr. K. A. Salman has been engaged in planning his work for the coming season, which will include a continuation of the Modoc surveys, carried on by Mr. Person until his transfer to the California Forest Experiment Station in December. He has summarized the work to date, and presented a progress report on the Devil's Garden Extermination Project in that region.

Studies on the development of western pine beetle broods under different conditions of temperature and moisture, which have been conducted for the past two seasons under field conditions, are now being continued in the laboratory of the California Station at Berkeley during the winter months. J. A. Beal, of the Portland Station, shipped a quantity of green logs and infested bark to Berkeley, where he is temporarily located in order to make use of equipment loaned for his use in this study. The University of California, Department of Plant Physiology, and the Bureau of Entomology have each supplied a number of different constant-temperature chambers which are in operation.

Mr. L. G. Baumhofer has been working over parasite material and data in reference to the control of the pine tip moth, Rhyacionia frustrana bushnelli, in the Nebraska National Forest by Campoplex frustranae Cushman, a parasite introduced from Virginia in 1925. A parasitism of approximately 78 per cent, including a small number of native parasites, was obtained in 1930 in the plantation where the original liberation took place, as compared to 83 per cent the year previous, indicating that perhaps the maximum parasitism by this species has been reached. However, with the continuation of this high parasitism the host population is still being reduced, as is evident from fewer infested tips. In a western yellow pine plot near the place of liberation 92 per cent of the leaders were infested by this

species of tip moth in 1926; this was reduced to 35 per cent in 1929 and to 15 per cent in 1930. This parasite was also recovered in 1930 from the Niobrara district of the Forest in northern Nebraska where about 1000 specimens were liberated in each of two planted areas the previous year. During two generations, including the over-wintering generation, Campoplex had more than doubled the less than 10 per cent parasitism that resulted from native parasites, at the points where liberations occurred.

Mr. Geo. R. Struble has been continuing his studies on the white fir engraver beetle. A report on the work of the 1930 summer season has been completed, and laboratory studies are in progress dealing with high-temperature effects on broods, rearing under laboratory conditions, and studies on an associated fungus infection.

R. N. Jeffrey has been setting up his laboratory apparatus and preparing to continue his plant physiological studies on western yellow pine, which have been in progress the last two summers.

Mr. R. L. Furniss has forwarded from Syracuse a report dealing with his summer's work in Region 5, entitled "Line Slash Studies on Western Yellow Pine".

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CENTRAL STATES FOREST EXPERIMENT STATION

General

McCarthy was given fifteen minutes on Station WAIU, Columbus, to explain the work of the Central States Forest Experiment Station. This is a part of a general plan drawn up by the Federal Business Association to broadcast the work of federal offices in this city.

Increasing interest in the study of the locust borer in the Central States region led to visits from two entomologists during the month; W. A. Price from the State College of Agriculture at Lexington, Kentucky and Dr. T. H. Frison, acting head of the Illinois Natural History Survey.

The Station made tentative plans for the development of nursery space in conjunction with several other departments of Ohio State University. These plans and also intensive experiments in the rehabilitation of an overgrazed woodlot on University property will be undertaken this spring if funds become available.

"A Soil Study of the Mont Alto State Forest" completed by Dr. J. T. Auten before he joined the Station, has just been published by the Department of Forest and Waters of Pennsylvania.

Litter Study (M-1)

Auten continued the analysis of samples taken last year in the study of virgin woodlands. He was engaged during the month in the analysis of the calcium and magnesium content of litter in an endeavor to learn the influence of forest in returning these two elements from the deeper soil to the surface, thereby offsetting the tendency to develop acidity in soils in this humid region.

Plantation Study (Fp-1)

Kellogg has been engaged in the compilation of data collected in the study of black walnut preparatory to computation of yield. He will leave about the middle of February for Washington to take advantage of assistance offered there. Areas of plots have been secured from field maps and converting factors computed. Height diameter curves for the plots are being drawn. In the field, it has been customary to spot each tree on the map and tally the tree in the appropriate DBH crown class on Form 547, at the same time making a double entry for each tree. In addition recording of the number of frost cracks per tree and determination of crown class has so loaded the tallyman, that errors may get into the yield tally. It is planned, therefore, in future plot work to prepare the map as has been done heretofore, and to secure the yield tally by reading it from the map.

Litter - Plantation Black Walnut

Opportunity was taken during the autumn to secure preliminary measurements of black walnut litter in an ungrazed and protected plantation in Squaw Creek bottoms at Ames, Iowa. This work is being done in cooperation with the School of Forestry at Iowa State College. Walnut leaflets and midribs from 10 half-milacre plots were gathered and the air dry weight determined.

At the same time, three distributed samples of the litter were oven dried, in entirety to a temperature of $97^{\circ}\text{C}.$, to secure the water content of the litter.

Water Content of Black Walnut Litter Plantation at Ames, Iowa.

Average of the three
samples on a milacre basis
grams -

Air Dry weight	1081.14
Oven Dry weight	464.39
Difference in Weight	616.75
Per cent of Water	
(basis of oven dry wt.)	132.8

On the basis of these determinations reduced to constant weight at 97° C., the acre of walnut 20 years old and 40 feet high, produces 829 pounds of litter annually.

It is planned to continue this work in the coming year and make periodic collections and weighings to trace the progress of leaf fall in this plantation.

Woodland Grazing Study (Pa-1)

Daniel DenUyl of the Purdue Agricultural Experiment Station spent three days in Columbus in preparing the outline for the report of the cooperative grazing study during the past summer. The study of classified farm woods of Indiana will probably be reported for publication by the Purdue Agricultural Experiment Station under title of "The natural regeneration of farm woods following the exclusion of livestock." Day and DenUyl prepared an outline for this report.

The working plan for the study of the carrying capacity of farm woodlands, to be conducted in cooperation with the Purdue Agricultural Experiment Station, is now in the hands of Director Skinner for final approval. This plan contemplates the stocking of 50 acres of woodland with cattle to determine the acreage necessary to support one head. Preparations are being made to start this work early this spring.

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LAKE STATES FOREST EXPERIMENT STATION

The entire staff is again busy in the St. Paul office. The routine compilation of permanent sample plot data relating to several projects has been one of the chief activities. Much of the data on the more active or temporary projects is still in an early stage of analysis, but preliminary results and some interesting leads are beginning to appear.

The study of the relation between soil type, forest type, site quality, and lower vegetation carried on by Kittredge and Roe during the past season, has yielded definite figures as to type relationship. Using percentages based on the road traverses of eight counties, it was found that the broad forest type areas could be predicted fairly closely from the areas of corresponding soil types. Since the correlation is not perfect - two or more forest types may commonly occupy a given soil type and vice versa - it is not possible to use the information to prepare detailed forest type maps from soil maps; but for an area as large as a county the acreages of the major forest types can be approximated. There are some ten million acres of land covered by soil

surveys in the northern Lake States to which such a correlation may be applicable. One difficulty encountered during the season's work was that the earlier rough soil survey maps are not very reliable and hence the soil as well as the forest had to be examined frequently. Another fact brought out is that the numerous subdivisions distinguished in the modern soil survey may often be reduced for forestry purposes to a few simple types. Another field season of work will be required to complete the study.

The report on projected planting and experimental work in North Dakota was completed by Bates in December. He is now working on stream-flow data for the Wisconsin erosion study and preparing an article on Norway pine seed trees. Laboratory germination tests of fifty seed samples has been carried on since October and some of the white pine samples are now coming out.

Compilation of weather and forest fire statistics from the observations made at the Roscommon field station has occupied the time of Mitchell and Neetzel since the close of the field season.

Under Cunningham's direction the computation and analysis of a considerable amount of stand, volume, and yield data secured on strip surveys and sample plots in connection with the state Land-Economic Surveys is taking form. The major purpose of this work is to secure more definite information as to forest stands and growth than the Land-Economic Surveys have provided in the past, and thus make their work contribute in a large way to the nation-wide forest inventory. In the closely related study of cut-over lands in Wisconsin, Gevorkiantz has prepared stand tables on the basis of the inventory strips and sample plots, classified by type, size class, age class, and density. The purpose is to find out what each given stocking type and class means in concrete terms of stand and volume. As a preliminary step, local volume tables for twelve (12) species were prepared by the alignment chart method. Several of these tables apply specifically to the very open grown trees tallied on the inventory strips. Growth predictions and considerations of financial returns from forest growth on cut-over lands will follow later.

Further evidence as to the cause of bird's-eye grain in sugar maple was obtained by Holmberg during the summer from an examination and ring counts of 46 logs at the plant of the Escanaba Veneer Company. Decadal diameter/^{growth} of the 27 butt logs with bird's-eye grain was compared with growth of plain-grain logs and with supplementary stump analyses made in the hardwood study of 1928. The results confirm Bates' "hunch" that bird's-eye is induced by or at least associated with very slow growth and suppression, particularly during the early life of the tree. For about the first 100 years' growth, the average decadal increments of the bird's-eye trees were almost entirely confined to the lower 25 per cent of the increment values for all trees. Sufficient indications have at least been obtained to justify further work along this line.

Zen addressed the Society of American Foresters at its thirtieth anniversary banquet in Washington, reviewing the changes in the forestry profession since the founding of the Society, and outlining its future field of usefulness. The quality of his speech may be judged by the fact that it was entombed in the Congressional Record - the resting place of our national oratory. Shirley presented a paper before the meeting of the American Society of Plant Physiologists in Cleveland on the subject, "Light Sources and Light Measurements". Approaching the subject from the standpoint of investigations with living plants, he brought out that the sun is the best and cheapest source of light to grow plants, but sunlight is extremely variable in intensity and quality. The most satisfactory artificial source is the Mazda lamp supplemented by a mercury arc in glass. The methods which measure the heating value of light are preferred to methods which measure the chemical, illuminating, or electrical effects.

The annual regional investigative meeting took place on January 30 and 31 at St. Paul. Regional Forester E. W. Tinker, Assistant Regional Forester H. B. Wales, Supervisor of Chippewa National Forest J. M. Walley, and Supervisor of Superior Forest S. D. Anderson, attended the meeting.

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NORTHEASTERN FOREST EXPERIMENT STATION

In order to get work started on the road construction on the experimental forests made possible by the emergency unemployment relief appropriation, Behre and Jensen spent a week in the White Mountains. They spotted locations for about three miles of permanent, light duty motor roads on the Gale River Experimental Forest, and more than four miles of similar roads on the Bartlett area. The objective of the road building program is to place all parts of the experimental forests within one quarter of a mile of a permanent road. Due to the stony and rough character of the terrain in the White Mountains, the costs are relatively high, and full realization of this objective will not be possible under present allotments. With these roads completed it should be possible to dispose of some material each year in the form of experimental cuttings.

Although the snow is from two to three feet deep in the Mountains a crew of four men has commenced work on the construction of bridges and in the clearing of right of ways.

During the month Westveld worked up some striking figures showing the results of girdling the plots established by the Eastern Manufacturing Company in Maine in 1919. These plots are located in typical mixed spruce

and hardwoods type with an initial stand of softwood consisting of forty merchantable trees averaging eight inches in diameter. The increased growth resulting from the girdling of the hardwoods which were considered worthless was sufficient to repay the cost of girdling in two years. In the eleven years following girdling, the merchantable volume has increased from about three to eleven cords per acre, which is about five times the growth which could have been expected without treatment. This is at the rate of more than three quarters of a cord per acre per year.

Stickel has completed all the computations in connection with the Cranberry Lake fire weather study. The final report will contain alinement charts from which duff moisture conditions may be estimated from evaporation, hours since last rain, and air temperature, based on readings at 11 a.m., 2 p.m., and 5 p.m. Consideration has been given to extending fire weather study in Connecticut, Cape Cod, and Lor Island in the future.

Jensen is working up the remeasurement data from the gipsy control plots; reports have been completed for the areas at Franklin and Exeter; New Hampshire, and Westbrook and North Berwick, Maine.

Miller has been in Washington for several weeks. He took with him for analysis all the stomachs of rodents and other animals which collected in white pine stands in recent months.

The chief activity for Spaulding and MacAloney has been working up the data of the past summer's work on the deterioration of birch. Their report on this project is now completed.

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NORTHERN ROCKY MOUNTAIN EXPERIMENT STATION

A successful annual meeting of the Region 1 Investigative Council was held in Spokane January 9 and 10. The men in attendance and the agencies represented included the following: E. W. Kelley (chairman), R. H. Weidman (secretary), Elers Koch, M. Bradner, F. J. Jefferson, T. Lomasson, D. S. Olson, H. T. Gisborne and I. T. Haig, of the Forest Service; S. N. Wyckoff, H. R. Orford, C. C. Strong, and Kermit Miller, of the Blister Rust Control Office; J. C. Evenden of the Bureau of Entomology; Lee Muck of the Indian Service; E. M. Keyser and F. C. Crombie of the Weather Bureau; T. C. Spaulding, J. H. Ramskill, and C. A. Schenck, of the Montana School of Forestry; E. E. Hubert of the Idaho School of Forestry; D. T. Mason of Mason and Stevens; N. G. Jacobson of the Western Forestry and Conservation Association; A. A. Segersten of the Potlatch Lumber Company; G. P. Melrose of the British Columbia Forest Service.

cut-over areas study of five years ago. With this study as with others in the past, we worked up only part of the data and preliminary results at the time, leaving the bulk of the computation for some later date when we should have money to employ adequate computing help. That time has not yet arrived but at least we have been able to make a start with one office assistant on duty full time last winter and this winter.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

Progress has been made by the Experimental Forest and Range Committee in the selection of areas to be withdrawn. Five natural areas have been definitely decided upon and only await completion of the reports to recommend them to the Forester. Also two experimental forests have been approved as to their general location, one at Wind River on the Columbia National Forest which is to be in two blocks, and one at Pringle Falls on the Deschutes National Forest. The definite demarcation of the boundaries must await spring field work.

A considerable number of requests have come for our two new publications on Douglas fir growth and yields, which materially has increased the volume of our correspondence.

Two more forest school students have been put on our temporary roll this month as computers, making five now employed working on fire studies and silvicultural projects.

McArdle has been appointed on a committee of the Western Forestry and Conservation Association to revise the state and association fire report forms to be used by the four western states.

Economic Aspects of Forestry

Axel J. F. Brandstrom, formerly professor of logging engineering at the University of Washington, began work with the Forest Service January 14, and Professor Burt P. Kirkland is devoting part time to the Forest Service until June when he severs his connection wholly with the University of Washington. Both are engaged on a study of the economic aspects of forest management and exploitation, and the immediate phase of this project will be the economic desirability and practical application of group selective logging in the Douglas fir region. It is proposed to have several field men working under Brandstrom make time and cost studies of several logging operations of various types with the purpose of determining the location and order of cutting which will

yield the largest profits from current operations and leave areas unsuited for any immediate cutting in the best situation for future increase in value. Kirkland and Brandstrom spent three days in Portland conferring with the Director about this project, and incidentally attended the meeting of the Society of American Foresters where economic selection of Douglas fir stands was discussed.

Forest Survey

A crew consisting of Pratt, Briegleb, and Fire Warden Herger, assigned by the State to this project, has begun to make a linear strip survey of Lewis County, Washington, running strips three miles apart east and west. This is being done to try out the technic and results of this method in comparison with the compilation method which has been adopted as the prevailing method for the Douglas fir region.

Matthews visited during the month eight supervisors' offices where office work on the national forest inventory is under way. He spent a week assisting the Snoqualmie Forest in getting started on the preliminaries of the Survey of that Forest.

Andrews and Cowlin spent a few days in the field studying in two different localities the serviceability of aerial photographs on one area where a series of verticals had been taken by Fairchild Airways, and on the other which Lage Wernsted had covered with obliques.

The National Park Service has presented us with a cover type map, just completed, of Rainier National Park which will be exceedingly valuable to the Survey.

Excellent weather through January has been unexpectedly favorable for field work, and the accomplishment proportionately large.

Forest Insurance

January was not a month in which progress was made in the fact-finding phase of the insurance study. Nevertheless a considerable amount of progress was actually made through much consolidation of ideas and definite decisions as to method, largely resulting from exhaustive conferences and elaboration of objectives and means of reaching them.

In addition to Shepard's having several conferences in the office with Munger, McArdle, and Simson, the work has been definitely furthered by conferences with E. T. Allen, Weather Observer Wells and his assistant, Mr. Dague, the Oregon Insurance Rating Bureau, State Forester Cronemiller, and Mr. Ellis of the Loggers Underwriters Insurance Association.

General and specific rating principles have been carefully reviewed and specific application made to the problem of forest insurance. In this connection a special study has been made of the method of rating public protection in rural districts for grain insurance. A close analogy exists here and definite help is afforded by such study.

The question of climate rating has been carefully and quite exhaustively considered so that actual work can be begun on this phase in the very near future if that seems advisable.

The question at the fore just now is that relating to methodology in the phase of the identification and evaluation of elements of specific contributive hazard. It is hoped that this will be settled within a few days and that actual fact-finding activity will be definitely under way at an early date.

Western Yellow Pine Growth and Yield Study

The preliminary computations on the selection plots and the even-aged yield plots of the western yellow pine growth study have now been practically completed and the analysis of the computations is under way. The major conclusions so far reached have been announced in previous reports and include such items as the checking of Behre's yield table with Oregon and Washington material, and the study of change in tree form and volume after release. The analysis which Meyer is now making is concerned with the growth of selection stands on the area basis, in the course of which the rules of relationship between basal area, cubic-foot volume, board-foot volume, and average diameter will have to be determined so that a satisfactory cross-check can be maintained in the various growth tables. The study of the growth of the individual tree will have to be postponed until after the area analysis is completed and until a sorting and tabulating machine is available.

Direct Seeding Tests

During the early part of the month, Isaac assisted by MacLay of the Olympic Forest, put in the third annual series of broadcast seeding tests using the small-seeded species of the fog belt. Hopes for success are based on the large number of seeds per pound and the small seeds being less attractive to birds and rodents. The tests were made on cut-over land in the Olympic Forest near Quinalt, Washington.

A seedling check was made on areas sown in 1929 and 1930 and the records worked up. The 1929 areas now have seedlings at the rate of 377 to the acre per pound of Sitka spruce seed sown, 556 per pound of western red cedar, and 1585 per pound of western hemlock. The 1930

areas made a poorer showing. One year after sowing they had 178 seedlings to the acre per pound of spruce sown, 263 per pound of cedar, and 288 per pound of hemlock. The results of the 1929 sowing are very gratifying and we are not discouraged by the poorer showing made in 1930 as both years were far below normal in rainfall, and 1930 was particularly dry during the critical months of June, July, and August.

Mr. Theodore Scheffer of the Biological Survey accompanied Isaac and Maclay to study the rodent population on the sowing area.

Regional Races of Western Yellow Pine

The 1930 progress report for the six plantations established in the spring of 1928 on three national forests and on the demonstration areas of the forest schools in the region show a mortality of nearly 8 per cent for the year. The plantations west of the Cascades are most promising. The trees are thrifty and 85 per cent have survived the unusual hot, dry seasons since planting. The plots east of the mountains have not been so fortunate. Their growth is less than half of the west side trees and have only a survival of about 30 per cent.

These results indicate the difficulty of getting seedlings established in the drier parts of the region. Undoubtedly if to be successful, the reforestation of the lighter soil areas in the yellow pine region will require special protection of the seedlings during the establishment stage as well as great care in planting.

Phenology in the Douglas Fir Region

Early in the month, Kolbe transferred the data from the field forms to the permanent record cards. During the year a total of 2403 observations were recorded for some 35 species. Reports were received from 23 stations. A summary of the year's work has been sent to all cooperating national forests and other agencies.

Fire Studies

Hour Control Analyses

The hour control analyses for the Blue Mountain group of forests is proceeding with "neatness and dispatch". The Umatilla Forest was completed about the middle of the month. Assistant Supervisor John Scharff of the Malheur and Fire Dispatcher Arthur Radigan of the Ochoco are on detail at the Station, and the analyses of their Forests will be completed the first week in February. A digression from the

Blue Mountain group then is planned in order to analyze a group of three Washington Forests - the Chelan, Odville, and Wenatchee. The much-revised working plan for this project has been completed and is being sent to the Regional Forester for his formal approval. It has been found essential for our purposes to change the original code scheme for punched cards so as to show elapsed time in actual hours (instead of time classes). A number of other changes also were found necessary to care for unforeseen situations. Certain departures from the technic for hour control analyses - as established by the work reported in Bulletin 209 - were found necessary for the Blue Mountain subregion. These changes are explained in a memorandum prepared by McArdle.

Climatology of Wind River

The climatology record for Wind River, covering the 20-year period 1911-30, was compiled by Simson during the month and is now in process of publication. It comprises 26 tables of meteorological data and should be a useful tool in fire, silvicultural, and meteorological studies.

Analysis of relative humidity records made under a mature Douglas fir forest and of records made in the open is bringing out some interesting facts. For example, the data show there was 30 per cent as many hours of humidity below 35 in the forest as in the open at the Wind River station, a half mile away. However, after the forest was logged off, the records show that in the slashing there was 109 per cent as many hours below 35 as there was at the Wind River station. In other words, removing the forest increased the number of hours below 35 two and a half times.

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SOUTHERN FOREST EXPERIMENT STATION

General

C. M. Granger and J. W. Girard arrived from Washington January 17 and spent the remainder of the month developing the Forest Survey of the hardwoods. C. F. Hunn from Washington spent a few days at the Station editing the Appling County, Georgia, Financial Aspects Report. Professor Nelson C. Brown of Syracuse made New Orleans his headquarters during January, while collecting lumbering costs and other data for the Tariff Commission.

Demmon spent several days in Washington. Later he attended the Commercial Forestry Congress held at Columbia, S. C. The last few days of the month he was with the Forest Survey crew on a reconnaissance trip and attended the meeting of the Hardwood Manufacturers Institute at Memphis.

Management

Wahlenberg, Chapman, and Olsen visited the Ouachita National Forest making a reconnaissance for a suitable area for an experimental forest, but no definite location has yet been selected. Chapman thinned the Bronson plot at Urania.

Forestation

Wakeley sent out about 100 seed samples to cooperators in seed germination tests and others. Prompt germination of longleaf pine seed stored for 1 year at low temperatures (a few degrees above freezing) confirmed similar results obtained a year ago. Gemmer spent the month at New Orleans working up Camp Pinchot data.

Protection

The pastures at McNeill were burned during the month and quadrats checked by Pessin. Measurements taken of terminal growth during the growing season of 1930 on the burned and unburned plots show that on the burned plot trees of two inch diameter class showed a total growth of 17 inches compared to 26 inches on unburned plots for the same diameter class. Chapman burned four plots of the series at Urania, one of which was the Roberts plot and which has been burned annually since 1913.

Naval Stores

The interval-of-chipping-test trees were scribed and a map of the plot prepared. The first 100 trees in the advance streak test were faced. The Sampson tract was burned over and also the Raiford tract. The fire line around the outside of the Kingsley tract was also burned. Sufficient cups were cleaned to be used on all the tests during 1930. At the time the advance streak test was faced a sample of gum was collected from the first streaks for Mr. Hall of the Forest Products Laboratory, but it was found that the yield was so small during the cold winter weather that the sample was insufficient for his needs. An effort will be made to get a more adequate sample later in the year.

Diller spent several days comparing our herbarium material with the material at the University of Florida. We now have mounted and identified about 160 genera and 250 species. The number of specimens runs close to 400.

Thinnings

5-quarter-acre thinning plots were laid out on the Budd tract in 27-year-old longleaf timber on Leon soil.

Extensive Surveys

Heyward spent most of the month preparing his report on the extensive surveys which were done in December. He also collected soil samples on the Edwards Plot near Starke which has had no fires in the last 15 or 20 years.

Library Index

Averell spent three weeks in January on the classification index of forest literature in Washington.

Publications

Wyman spent most of the month with Mr. Hunn from Washington, revising his bulletin.

Averell prepared two articles, one dealing with hog cholera, and the other one dealing with forest bibliography.

The naval stores posters, designed by Wyman, emphasize small yields obtained from small trees. They are now being distributed by the state foresters, naval stores factors, extension men, and by other agencies.

Tools

Some progress was made on the developing of new tools for scribing faces. Plans were made for new devices for tacking tins on trees.

Rainfall records

The annual rainfall at Starke for the past 5 years has been respectively 61.62", 41.73", 62.74", 51.11" and 55.40". This shows that 1926 and 1928 were relatively rainy and that 1927 was considerably under the normal in rainfall. 1930 which was a drought year over a considerable part of the eastern United States was not as dry as 1927 or 1929, and, in fact, had approximately average rainfall.

Financial Aspects

The month was spent by the Economics crew in the office revising the Appling County, Georgia, report and working on the various Florida County reports. Dr. Ziegler met Dr. R. L. Thompson, Economist, at the Louisiana Agricultural Experiment Station and made arrangements

for a cooperative study of a Louisiana County in the near future. Plans have been made for a study of a Texas County in April, in cooperation with the Texas Forest Service and Texas Agricultural Experiment Station.

Erosion

Sinclair spent several days in Washington. A working plan for erosion work during the year and two articles covering erosion have been prepared. Spring planting of a number of species to stop erosion are included in the plan of work.

Hardwoods

Winters and Bull completed reports on the hardwoods of Tunica County, Mississippi, and the Thistlethwaite Reserve near Opelousas, Louisiana, during the first half of the month and spent the last half on a reconnaissance of the Mississippi bottomland hardwoods of Louisiana and Arkansas. They attended the annual meeting of the Hardwood Manufacturers Institute at Memphis on January 30. During the trip many instances of the severity of the drought was noted; often cypress and hardwood flats, which ordinarily are under water, were extremely dry.

Forest Survey

Granger and Girard with Lentz made a tour through the bottomlands of Louisiana, Arkansas, and Mississippi. At Opelousas, La., they were conducted by J. A. Putnam over the Thistlethwaite Forest in St. Landry Parish. They visited the Fisher Lumber Co's mill at Ferriday and also some of their logging operations.

At Lake Providence they saw hackberry (usually considered a weed and one of no value) being worked up by the Marks Brown Mill into base ball bats; ash and pecan were also being used.

At Monroe Mr. Deeter of the Bureau of Chemistry and Soils told them of his work in studying soil conditions in the Boeuf and Atchafalaya floodways. It was Mr. Deeter's opinion that very little forest land would be required for conversion to agricultural land within the next 30 to 50 years.

Mr. Houston at Vicksburg showed the men through his double band mill, gave them his ideas concerning the Forest Survey and offered full cooperation. Major Lee, Capt. Fitzpatrick and other members of the Army Engineers of the Vicksburg district showed how the Engineers were making their topographic maps of the Mississippi River Delta lands. Maps similar to those published by the U. S. G. S. compiled from aerial photos will be available for the Vicksburg district June 30th. These maps will prove of inestimable value as base maps for the Survey.

Demmon joined the party at Memphis and all attended the meeting of the Hardwood Manufacturers Institute. This was a wonderful opportunity to meet the leaders in the hardwood industry.

Pathology

The progress of investigations to date on the control of sap stain and molds in southern lumber, and stain and decay in logs by chemical treatments has been encouraging. A summary of the results on lumber has been published in some of the recent lumber trade journals. Much further work remains to be done before the most effective treatments can be recommended definitely for commercial adoption.

However, on the strength of the results obtained in the tests of the past summer, about 15 mills in the South have already adopted the ethylmercury phosphate treatment for their lumber dip and are reporting excellent results. A progress report on the first series of log tests has been completed, for distribution, by the American Pitch Pine Export Company, cooperators in these investigations.

At their request several mills initiating the ethylmercury phosphate treatment were recently visited for the purpose of advising them regarding the use of this dip.

A dipping test pertaining to the pretreatment of poles has been established at the Long Bell Treating Plant, Shreveport, Louisiana; also tests on red oak lumber was run at Trout, La., to ascertain the value of some of the better treatments in treating this species.

In connection with the brown-spot needle blight of seedling longleaf, an experiment was started in June 1929 near Bogalusa, Louisiana to determine the influence of removal of soil cover on the needle disease. Six plots were staked out in an area of heavy grass; on the alternate three, all vegetation except longleaf seedlings was pulled up and thrown outside the plots. Three of the plots were left untouched for checks.

On February 10, 1930, an estimate was made in percentage of the dead needle tissue on all seedlings in the six plots. From this individual plant inspection the average amount of disease per plot was obtained. The plots where all vegetation had been removed averaged 43% dead leaf tissue; the untouched areas in high grass averaged 24%.

The same seedlings were examined on January 22, 1931. The mean percentage of the disease on the three plots where soil had been kept bare for nineteen months was 67%, while the average value for the brown-spot on the three check plots was 24%.

In June 1930, this experiment was extended to include six new plots, contiguous with the six staked out in 1929. By January 1931, the average amount of disease on the three new plots with bare soil, was 50%; the mean of their respective checks was 31%.

For the six control areas, the average amount of disease per plot in percentage of total leaf length was 39, 29, 24, 26, 23 and 22. The estimates were made in January 1931. These plots are staked out in the order listed. A decrease in ground cover occurs from right to left, particularly noticeable on the first two areas. Mean plot values for brown-spot increase steadily from right to left with the exception of one plot, corresponding with a decrease in soil cover.

For the Bogalusa region, the following conclusions are suggested:

Removal of soil cover results in an increase in the brown-spot needle blight.

Increase in disease induced by removal of ground cover is related to the original density of grass, sedge, etc., on a given area. Areas with poor ground cover originally, show a relatively small increase in disease when compared with adjacent untouched plots.

By carrying the experiment through two growing seasons it has been shown that the effect on the incidence of disease was cumulative.

The six untouched plots, indicate that the amount of the needle-blight on seedling longleaf varies inversely with density of ground cover.

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SOUTHWESTERN FOREST AND RANGE EXPERIMENT STATION

Attendance of the annual meeting of the Regional Investigative Committee and the preparation of reports connected therewith were major items in the research program during January. The meeting was held in the Regional Office, January 6-7. The experiment station was represented by Pearson, Cooperrider, Culley, and Campbell.

Forest Research

The Timber Growing and Logging Practice report for Region 3 was reviewed with the Regional Forester, all Branch Chiefs and others in the Regional Office. The report has been revised and will be submitted to the Forester as soon as typing is completed.

An experiment on the amount of shade western yellow pine seedlings will endure was begun in May, 1928. Nine 2-1 transplants were planted in full sun, in .5 lath shade and in .9 lath shade. In July seeds were sown in all three plots. Germination was delayed about 2 days in the half-shade and fully 10 days in the .9 shade. The final per cent was also distinctly lower in the .9 shade. At the end of the season, the seedlings grown in half-shade were noticeably taller and more slender than those in full sun; those in .9 shade were very much taller and distinctly succulent. The transplants in the dense shade also began growth later than those in the sun or half-shade, and their growth during the season was distinctly below that of the other two plots.

In April, 1930, every seedling and transplant in the .9 shade was dead. Those in the other two plots appeared normal.

In May, 1930, the plantings were repeated, replacing the .9 shade with one of .8. The transplants behaved much the same as in 1929. Seeds sown in the three light intensities germinated in much the same relation as in 1929, but the results were generally poor because of damping off, despite acid treatment. This is attributed to re-infection by flooding during heavy rainstorms.

At the present time the 1929 transplants and seedlings in half-shade show a more slender form than those in full sun. This is true of the leaves as well as the stems.

Soil temperatures at a depth of 6 inches read at 1 and 5 p.m. through August and September, 1929, were consistently lower in proportion to the amount of shade. Thus, on September 8, 1 p.m. the readings were: Sun 61° F., half-shade 56°, and 90% shade 51°; at 5 p.m. sun 69°, half-shade 53°, 90% shade 52°. The extreme difference of 17 degrees in the last reading is not uncommon on clear days. That the poor germination in dense shade is due to low temperature is scarcely to be doubted. Heat probably also enters into the explanation of the behavior of the seedlings and transplants, although here the more comprehensive term "radiant energy" is more applicable. The winter killing in this experiment throws a significant side light on the grass competition experiment previously reported.

A winter of unusually persistent cold, though not extremely low temperatures, is being experienced through the Southwest. Snowfall is below normal. At Fort Valley, the absence of snow and the prolonged cold has resulted in the freezing of water pipes to a depth of 30 inches. The effects of this soil condition on tree growth are awaited with apprehension.

Range Research

Jornada Experimental Range

The region of the Jornada has received a number of good rains since January 1. Up to the 27th, total precipitation at the Headquarters Station was 0.83 inches. Soil moisture conditions are improving with each successive shower. The prevailing low temperatures have decreased the evaporation rate so that most of the moisture received has accumulated in the soil, and therefore the prospects for early spring feed are favorable.

Cattle are in very good condition, showing a general improvement since December.

January has been an exceptionally busy month. Usual activities have been added to by preparations for road construction provided through unemployment agitation. The City Officials of Las Cruces have cooperated with the Jornada by aiding in the selection of the best men from the city's emergency employment crew. The foreman of the construction crew, has had eleven years experience in highway construction and maintenance work. For a number of years he has superintended the building of roads in Southern New Mexico, therefore, we expect to have some good roads on the Jornada in the near future.

Mr. S. E. Aldous of the Biological Survey spent a week on the Jornada checking rodent damage and looking into the coyote problem. He finds fewer rodents now than at any time in any of the several recent years. His observations indicate an increase in the coyote population.

Campbell left for detail to the Washington office of Research on January 27th.

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ROCKY MOUNTAIN REGION

The first three days of the month were spent by Roeser at the Fremont Station to relieve Williamson and to complete some necessary tasks in connection with the experimental forest management study, the type study, and the study of water requirements of coniferous seedlings.

The annual investigative meeting was held on January 28 and 29 in the Regional Office, Regional Forester A. S. Peck presiding. In addition to the chiefs of branches, Supervisors and Experiment Station

representative, the forestry departments of Colorado College and Colorado Agricultural College were represented, as was also the Rocky Mountain Biological Station through its Vice President, Dr. Francis Ramoley, of the botany department, University of Colorado.

Roeser presented the Experimental Station program, Mr. H. D. Cochran the regional program of administrative studies, and Mr. L. H. Douglas the grazing studies program. Considerable discussion was given to the erosion studies now being conducted, to the tentative program of erosion-streamflow studies for the Rocky Mountain region, and to the question of expansion in this line of investigation in which the region is not only very much interested but also desirous of engaging to the fullest possible extent. The grazing quadrat and camera point studies received considerable attention on the part of the committee. A sub-committee reported on the status of natural areas and outlined a program which shall govern the future withdrawal of areas for this purpose.

The camera point committee convened on January 30 to consider the reports of the various Forests and approved the inclusion of several new camera points and old points for which early pictures are available in the regional series.

Roeser remained in Denver over the end of the month in order to prepare the investigative report in its final form.

Mr. Louis Duplaquet of the French Forest Service spent two days in mid-month at the Station in order to acquaint himself with several of the indigenous species of the Pikes Peak region and to study their possibilities for introduction in south France on calcareous soils. Mr. Duplaquet's visit was on a mission for the French Forest Experiment Station. During his stay he visited the older plantations of the Pike Forest in North Cheyenne Canyon and also the Fremont field station of the Experiment Station. He was particularly interested in limber pine (*Pinus flexilis*). One of the rare pure stands of this species is to be found within the Fremont Experimental Forest. After leaving Colorado Springs, he spent a day with Regional Forester Peck in Denver.

Senior Ranger W. H. Pletcher reported at Colorado Springs Office of the Experiment Station a few days before the end of the month on a temporary assignment until spring. He will be engaged primarily in compiling management sample plot study records during his stay.

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MANUSCRIPTS

APPALACHIAN

Positive Gas and Water Connections in Oaks. By C. R. Hursh and C. A. Abell. (To Science)

Forest Soils and Fire Damage, by C. R. Hursh. (Address before Appalachian Section, S. A. F. Jan. 24, 1931)

Forest Trees and Fire Damage. By I. H. Sims. (Address before Appalachian Section, S.A.F., Jan. 24, 1931)

LAKE STATES

Does Light Burning Stimulate Aspen Suckers. By H. L. Shirley. (Journal of Forestry)

Mapping of Forest Soils. By H. F. Scholz. (Ames Forester)

The Land Economic Surveys in the Lake States. By R. N. Cunningham. (The Utah Juniper)

Forestry and the Economic Crisis. By Raphael Zon. (American Forests.)

Light Sources and Light Measurements. H. L. Shirley. (Am. Soc. Plant Physiologists)

CENTRAL STATES

The Relation of Grazing to Farm Woodland Management. By R. K. Day. (Talk before Annual Farmers Week of Ohio State University)

PACIFIC NORTHWEST

The Relation of Mycorrhizae to Coniferous Tree Seedlings. By R. E. McArdle (Jour. Agr. Res.)

Working Plan for Hour Control Study of Fire Reports and an Accompanying Memorandum. R. E. McArdle

CALIFORNIA

Studies in the Role of Forest Vegetation in Eater and Erosion Control. By W. C. Lowdermilk (Soc. Agr. Engineers, Jan. 7, 1931)

Conservation of our Forests. R. B. Weaver. (Women's City Club of Colton.

Following papers delivered at the meeting of the Western Division of the A.A.A.S. on December 23, 1930:

Effectiveness of Rainfall, By W. C. Lowdermilk.

Some Aspects of Succession Following Fire in Chaparral, by C. J. Kraebel.

Tree Selection by the Western Pine Beetle. By H. L. Person.

Studies of the Erosion of Bare Soil Surface. By H. L. Sundling.

ALLEGHENY

Large Yellow Poplar killed by Porcupines. By H. F. Morey (Am. Forests)

Refinement of Computations Necessary in Solving for Several Variables, by G. Luther Schnur.

Diameter Distribution in White pine Stands of Northwestern Pennsylvania. By A. F. Hough.

IN PRINT

Barrett, L. I. Possibilities of Fire-Extinguishing Chemicals in Fighting Forest Fires. (Jour. For. Feb. 1931)

Harper, V. L. French Face Experiments in Turpentining. (Jour. of For. Feb. 1931)

Kotok, E. I. Erosion: A Problem in Forestry. (Jour. For. Feb. 1931)

Lentz, G. H. Rev. of: Soil Erosion, A Local and National Problem," by C. G. Bates and O. H. Zeasman. (Jour. For. Feb. 1931)

Lowdermilk, W. C. Forestry in Denuded China. (Vol. 152 of the Annals of the American Academy of Political and Social Science.)

Morey, H. F. A Test of Hypsometers on Short Trees. (Jour. For. Feb. 1931)

Munger, T. T. Rev. of: The Yield of Douglas Fir in the Pacific Northwest. By R. E. McArdle and W. H. Meyer (Jour. For. Feb. 1931)

Pearson, G. A. Rev. of: The Climate Past and Present, by Axel
Wallen. (Jour. For. Feb. 1931)

Simson, A. G. Relative Humidity and Short-Period Fluctuations in
the Moisture Content of Certain Forest Fuels.
(Mo. Wea. Rev. Sept. 1930).

Simson, A. G. Note on the Effect of a Lightning Bolt. (Mo. Wea.
Rev. Nov. 1930).

Zon, Raphael Society Comes of Age. (Congressional Record.
Jan. 5, 1931).

Zon, Raphael Resource Development Seen as Depression Cure
(St. Paul Pioneer Press. Jan. 4, 1931).

FOREST PRODUCTS - Region 1

Logging Output Studies Bulletin

On January 24, 1931, the latest completed manuscript covering the Region's logging output studies was transmitted to Washington for editing and approval. The manuscript was reviewed by Mr. Jones Girard, Mr. F. J. Klöbucher, and Mr. Bradner in Portland in December. Assistant Regional Forester E. Koch and Logging Engineer Philip Neff of Region One also reviewed the manuscript. Corrections and suggested improvements made by the several reviewers and accepted by the co-authors were incorporated in the manuscript sent to Washington.

Forest Products Study Course

Seventeen Forest officers and one National Park ranger have enrolled in the Forest Products study course. Included among the Forest officers are three Forest Supervisors.

Logging-Milling Studies

Must Small Western Yellow Pine Trees be Cut in Order to Obtain No. 1 Common Lumber?

You have no doubt heard some lumberman say that he must cut western yellow pine trees down to a very small diameter limit in order to obtain No. 1 common lumber. He says: "While it is true that the larger trees cut the finer products, it is also true that they cut the coarsest. With No. 1 common and the finer portions of No. 2 coming from smaller logs and with these selling equal to or higher than the lower grades of finish such as D Select, it would be foolish for me to refuse to cut at least a large part of the smaller trees found in the stand. From these small trees I secure an essential product which I can hardly get from the larger timber." You have been telling this lumberman of the advantages of selective logging and sustained yield - what are you going to tell him about small western yellow pine trees and No. 1 common lumber?

In the first place, No. 1 common western yellow (Pondosa) pine lumber should not be considered an essential product. Western Pine Manufacturers Association figures averaged over a period of seven years show that annually only 7/10 of one per cent of No. 1 common is produced and sold. If no No. 1 common (Pondosa pine) lumber was produced it would not materially affect the sale of the remainder of the products. The consumer would learn to do without this grade of Pondosa pine lumber.

Agreeing that the lumberman must stock some No. 1 common in order to satisfy his customers, the following facts should be known.

That though a higher percentage of No. 1 common lumber can be cut from small western yellow pine trees and logs, the actual footage in board feet cut from a large tree may be many times that cut from a small tree. As an example, an analysis of Gibbons' Woods and Mill Study data at Bend, Oregon, shows that while but 4.7 board feet of No. 1 common (11.01%) can be cut from the average 10" tree, the 19" tree will produce 24.9 board feet (6.53%) of this grade. This means that in order to produce 1 M feet of No. 1 common lumber 40 - 19" trees would need to be cut as compared to 200 - 10" trees. As it costs \$28.62 per M (rough green lumber basis) to produce a thousand feet of lumber from 10" trees and but \$19.56 per M (rough green lumber basis) to produce the same amount from 19" trees, the difference in cost is obvious. Or, based on the percentage of tree diameters in the Bend Study stand, the operator would need to cut-over nearly 29 acres to obtain the same amount of No. 1 common lumber from 10" trees as he could obtain on one acre from the 19" trees.

The following table shows the amount in board feet of No. 1 common lumber cut from western yellow pine trees of different diameters in the Bend, Oregon, and western Montana districts..

The Amount (Feet B.M.) of No. 1 Common Lumber Cut From
Western Yellow (Pondosa) Pine Trees of Different Diameters

Tree : D.B.H. : (ins) :	Ft. b.m. of No. 1 Com. : Oregon : near : Bend :	Western : Montana :	Tree : D.B.H. : (ins) :	Ft. b.m. of No. 1 Com. : Oregon : near : Bend :	Western : Montana :
10	5	-	26	7	3
11	4	-	27	11	7
12	5	3	28	19	6
13	11	6	29	3	7
14	14	5	30	11	5
15	18	6	31	3	31
16	21	5	32	1	0
17	24	10	33	6	2
18	24	5	34	10	3
19	25	8	35	0	0
20	19	9	36	0	-
21	22	4	37	0	12
22	22	6	38	0	8
23	19	11	39	4	0
24	25	9	40	0	0
25	7	6			

°Based on 748 trees scaling 480 M ft. (From Gibbons, Johnson, Spelman Study at Bend)

♂Based on 624 trees scaling 389 M ft.

No No. 1 common lumber 10" and wider was cut from any western yellow pine tree under 18" in d.b.h. Western Pine Manufacturers Association figures for 1929 show that in the Oregon District 37 per cent of all the No. 1 common lumber sold was in widths 10" and wider. In the Spokane District, during the same year 43 per cent of the No. 1 common sold was 10 inches and wider. This means that over a third of the No. 1 common lumber produced and sold must have come out of trees 18" and over in d.b.h. Of the remaining 2/3, a good percentage must have come out of middle and top logs of medium or large-sized trees.

A further analysis of the western Montana tree data shows that in the trees from 12 to 17 inches in diameter only 10 per cent of the No. 1 common lumber came from butt logs, 75 per cent from middle logs and 15 per cent from top logs. It is obvious that in the mill the operator knows only that the No. 1 common comes from small logs, except in the case of butt logs. He does not know what percentage of the small middle and top logs come from trees of quite respectable diameters, nor, for a certainty, where he does get his No. 1 common.

On one of the Western Montana western yellow pine study units data on the "bull pine" were kept separate. Analysis of these data shows that in trees from 12 to 17 inches in diameter 87 per cent of the

No. 1 common lumber was obtained from "bull pine." "Bull pine" trees of good size are common and must produce a high percentage of the No. 1 common cut.

Census Schedules for 1930 are Mailed

The Census projects for 1930 on which this office will cooperate with the Bureau of the Census, include lumber production, lumber distribution and stumpage and log prices.

All of the forms, envelopes, and other supplies needed in this canvass were received on or before January 14. New address lists based on previous records, 1930 reports from the Forest Supervisors and other sources were compiled and all first requests mailed to mills in North Idaho and Montana before the end of the month.

The lumber, lath and shingle production schedule was sent to all mills of record in this region. The form for reporting lumber distribution was sent only to R-1 mills which cut a million feet or more. The stumpage and log price questionnaires were mailed with the census of production schedule to all mills reported active the preceding year.

The total mailing list for both States includes approximately 525 mills. Returns from the first request are now coming in.

Breakage Study

Field work and office compilation have been completed for the western white pine, western yellow pine and larch-Douglas fir types. The results will be presented in The Timberman in the near future. The analysis showed that the average white pine tree felled in the study was 22 inches in diameter breast high. Data were obtained on 2257 white pine trees. The average 22-inch tree including the wood from the ground line to a 3-inch top diameter contains 171.7 cubic feet divided as follows:

Volume in stump cubic feet	3.81	-	2.2%
" " sawlogs " " "	158.30	-	92.5%
" " breakage " " "	5.54	-	3.2%
" " top merchantable	1.50	-	.9%
" " nonmerchantable	2.05	-	1.2%

The breakage is greater in felling white pine than any other species excepting larch and even that 3.2% is nothing to be alarmed over if it were uniform under all felling conditions. It is not. One area of white pine 180 years and older upon which timber was felled when frozen suffered a breakage loss of 10%.

A.C.M. Relogging Study

Office compilation for this project is 90% completed. Technical Assistant Bloom from the Cabinet Forest has been on detail on this work since December 15.

In 1888 the A.C.M. Company removed 8040 feet log scale per acre from the area under a "high grading" cutting policy. Western yellow pine was the principal species cut. They left a residual stand of all species 8 inches d.b.h. and larger of 2240 feet per acre. In 1927 they relogged the area and obtained 4050 feet per acre in trees 11 inches d.b.h. and over. Thus, one acre produced 1810 feet b.m. of log scale during the 39-year period or at the rate of 47 feet of log scale per acre per year.

There is at present an excellent residual stand of timber containing a volume of 1150 feet log scale per acre in trees 8 inches d.b.h. and over. There are 24.2 western yellow pine trees per acre 8 inches d.b.h. and over and 275 less than 8 inches d.b.h. The average diameter increase for the average yellow pine tree during the 39-year period was 1.03 inches per decade. A diameter increase of 1.16 inches per decade is indicated by former studies on areas cut over under Forest Service marking regulations.

Lumber Prices & Movement

<u>Av. Mill-Run Prices</u>	<u>Annual,</u> <u>1929</u>	<u>1st Q.,</u> <u>1930</u>	<u>2nd Q.,</u> <u>1930</u>	<u>3rd Q.,</u> <u>1930</u>	<u>4th Q.,</u> <u>1930</u>
Idaho White Pine	\$34.33	\$35.33	\$34.28	\$33.72	\$30.59
Western Yellow Pine	23.17	24.57	23.29	19.27	18.89
Larch-Fir	20.29	18.55	18.23	16.28	15.69
White fir	20.94	19.45	18.45	15.65	13.90
Spruce	24.23	23.51	22.76	20.42	20.64

<u>Shipments and Cut</u>	<u>1929</u>	<u>1930</u>
Shipments	95,113,344	86,130
Cut	111,803	63,145

<u>Annual Shipments and Cut</u>		
Shipments	1,761,184	1,399,894
Cut	1,825,470	1,460,894

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FOREST PRODUCTS - Region 6

Branch of Research

General

Junior Forester E. F. Rapraeger, who was transferred from the Snoqualmie Forest to the Office of Products, reported for work on January 2. His transfer was effective on January 5 and his earlier appearance was with the approval of Supervisor Weigle of the Snoqualmie.

Gibbons is still on detail in the Washington office and Spelman is continuing his extended leave of absence. The services of Junior Typist Evelyn Leonard, temporarily employed, terminated on January 31.

Survey of Sawmill Waste in the Douglas Fir Region

With the exception of the time required for handling the administrative and current work of the office during Mr. Gibbons absence in Washington, D. C., the office computations relating to this project have accounted for all of Hodgson's time during the last month. This phase of the work has also occupied all of the attention of Rapraeger, Mrs. Johnson and Miss Leonard.

The preliminary computations, covering the intensive sawmill waste studies made at six Douglas fir sawmills last October and November by Hodgson have now been compiled and summarized into individual study shift reports. Copies of these have been forwarded to each of the six cooperating sawmills. The individual reports which are plainly marked "Confidential Information" describe in considerable detail the results of the study at each sawmill. The data contained in these preliminary reports will next be tabulated and shaped into composite figures for use in the final report. The results of these intensive studies have developed some very valuable conversion factors which are to be used in checking the production and utilization of sawmill waste estimates which several hundred members of the industry submitted last winter on questionnaires sent out by this office.

Complete sets of the preliminary reports of intensive sawmill waste studies conducted during 1929 and 1930 have been assembled and copies are being furnished to the Pacific Northwest Forest Experiment Station and to Forest Management (R-6). Each set is composed of seventeen individual reports, nine applying to western hemlock sawmills and eight to Douglas fir sawmills.

As a by-product of the sawmill waste studies some very good data pertaining to the relative over-run between logs scaled on a 32-ft. length basis and logs scaled on a 40-ft. length basis were secured. With all of this information now in shape for use, Check Scaler Stevenson of Forest Management and Hodgson expect to prepare a report

on this subject which should be of value to the timber sales organization in adjusting prices to conform to the local commercial scale which is based on the 40-foot log length instead of the 32-foot log length which has up until recently been used by the Forest Service.

Study of Industries Producing Minor Forest Products in Oregon and Washington

The character and purpose of the study was briefly outlined in the October, 1930 report. The bulk of Johnson's time is now being devoted to this project. During the month, 105 fuel companies in Portland and vicinity were visited and information secured relative to the consumption of cordwood in Portland in 1930. With a few small concerns yet to cover, the results of the canvass show slightly better than 50,000 cords of Douglas fir cordwood, 8,500 cords of Oregon white oak and 400 cords of western ash were handled by the fuel dealers in 1930. It is estimated that this represents almost 85 per cent of the cordwood consumption, the other 15 per cent being marketed direct to the consumers by farmers and other small producers. These figures refer to split or round cordwood only and do not include sawmill waste/^{wood} which is used in large quantities.

The cost of the cordwood to the fuel dealers f.o.b. yard was about \$6.50 per cord for Douglas fir, \$3.50 for oak and \$8.00 for ash.

Fuel dealers state that the consumption of cordwood is decreasing each year due to the increased use of oil, gas, and sawdust for residential heating.

Also questionnaires requesting information relative to cordwood consumption were mailed to 1324 schools in Oregon. About 400 replies have been received to date.

1930 Census of Lumber, Lath, Shingles, etc.

The regular U. S. Bureau of Census questionnaire for lumber, lath and shingles, (Form 380 W.S.) was sent to 752 companies in Washington and 758 companies in Oregon. Form S (Stumpage and Log Prices) was sent to 264 Washington companies and 139 Oregon companies.

To date (January 31) 250 replies have been received from the Washington concerns and 195 returns have been sent in by the Oregon operators.

West Coast Lumbermen's Ass'n Meeting

The association held its annual meeting, with President John D. Tennaut, Vice-President of the Long-Bell Lumber Co., presiding at Tacoma, Washington on January 30.

The following addresses were presented at the meeting:

"Where Do We Go From Here" - President John D. Tennaut.

"Obvious Opportunities for Increasing Lumber Demand and Sales" - A. C. Dixon, President National Lumber Mfg. Ass'n.

"National Trade Promotion Plans and Opportunities" - Walter F. Shaw, Mgr., Trade Extension Dept., National Lumber Mfg. Ass'n.

"A Better Organized Lumber Industry" - Col. W. B. Greeley, Sec. and Mgr. West Coast Lumbermen's Ass'n.

"What the Forest Products Laboratory is Doing to Promote the Wider and Better Use for Lumber" - C. P. Winslow, Director, Forests Products Laboratory.

"America's Foreign Trade Opportunities" - Brice M. Mace, Jr., Western Representative of the U. S. Dept. of Commerce.

It is reported that the meeting was not especially optimistic as to the immediate return of an increased demand for lumber.

Forest Research Laboratory at University of Washington to be Urged

The January 1931 issue of "The Timberman" contains the following article -

"Establishment of a forest products research laboratory at the University of Washington will be urged before the Washington state legislature at the coming session by J. C. Price, representative from Skamania County.

"The time is ripe for a great deal of intensive research work and experimentation which will adapt lumber more adequately to present day requirements," Representative Price contends. "Fire-proofing and protection from decay should be developed. Rustless steel is coming. Let us meet it with rot-proof and fire-proof wood. Development of additional uses for forest products is needed by the entire state," Mr. Price said.

"Improvements in paper pulping, wood distillate, cellulose, textiles and the like will prove outlets for our waste material and bring more industries into Washington."

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FOREST TAXATION INQUIRY

The entire force of the Inquiry was in the office during the month, Wager at Chapel Hill, North Carolina, Murphy at Washington, and the remainder at New Haven. The time was largely devoted to completion of intensive studies in various regions, to reports on studies of special forest tax legislation, and to work on portions of the comprehensive report.

Progress Report No. 10 entitled, "Tax Delinquency in the Forest Counties of the Lake States," by H. H. Chapman and Daniel Pingree was distributed to the mailing list.

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